

Amendments to the Claims:

This listing of claims will replace all prior versions of claims in the application.

1. (Currently Amended) An apparatus for processing a workpiece comprising:

a liquid supply source;

one or more liquid outlets for applying ~~disposed to apply~~ a layer of liquid onto the workpiece;

a liquid flow line extending between the liquid supply source and the one or more liquid outlets for carrying liquid to the liquid outlets;

at least one heater for heating the liquid before it is applied onto the workpiece;

an ozone gas supply system which provides ozone gas around the workpiece while the layer of heated liquid is on the workpiece; and

a sonic energy source associated with the liquid [[outlets]] outlet, and positioned adjacent to the workpiece for introducing sonic energy to the workpiece with the sonic energy conducted through liquid flowing out of the liquid outlet and through the layer of liquid [[on]] to the surface of the workpiece.

2-4. (Cancelled).

5. (Original) The apparatus of claim 1 wherein the sonic energy source comprises a sonic transducer including a focusing chamber for concentrating sonic energy onto the workpiece.

6. (Original) The apparatus of claim 1 where the liquid supply source comprises a liquid reservoir, and where the heater heats the liquid in the reservoir.

7. (Original) The apparatus of claim 1 where the liquid supply source includes a liquid selected from the group consisting of, ammonium hydroxide, sulfuric acid, hydrochloric acid, hydrofluoric acid, a surfactant, de-ionized water, and a combination thereof.

8. (Original) The apparatus of claim 1 further comprising a chamber around the workpiece and with the ozone gas supply connected to the chamber to provide ozone gas around the workpiece in the chamber, with the ozone provided as a dry gas or in a liquid.

9. (Original) The apparatus of claim 8 further comprising a re-circulation liquid line extending between the chamber and the liquid supply source.

10. (Currently Amended) The apparatus of claim 8 further comprising a rotor assembly in the chamber for rotating the workpiece to provide relative movement between the sonic energy source and a workpiece held in the rotor assembly.

11. (Cancelled).

12. (Original) The apparatus of claim 1 further including means for controlling the thickness of a layer of the liquid formed on the surface of the workpiece.

13. (Original) The apparatus of claim 12 where the means for controlling comprises a liquid flow control system for controlling the flow of liquid onto the workpiece.

14. (Original) The apparatus of claim 13 where the liquid flow control system includes spray nozzles.

15. (Original) The apparatus of claim 12 where the means for controlling comprises a rotor for holding and rotating the workpiece.

16. (Currently Amended)) An apparatus for treating the surface of a workpiece comprising:

a liquid reservoir for holding a process liquid;

a process chamber;

~~a workpiece holder within the process chamber;~~

liquid spray nozzles within the process chamber disposed to spray liquid onto the workpiece held by the workpiece holder;

a liquid flow line extending between the liquid reservoir and the liquid spray nozzles;

a rotor in the process chamber for holding a single workpiece and rotating the workpiece to form liquid on the workpiece into a layer;

an ozone generator for generating a supply of ozone;

one or more ozone supply lines extending from the ozone generator to the process chamber, and with ozone gas in the process chamber diffusing through the layer of liquid and oxidizing contamination on the workpiece surface;

at least one heater for heating the process liquid; and

a sonic energy source associated with the liquid outlet on the workpiece holder for introducing sonic energy to the workpiece, with the sonic energy assisting to expose fresh contamination and rendering it more subject to oxidation by the ozone.

17. (Previously Presented) The apparatus of claim 16 where the workpiece support holds the workpiece in a horizontal orientation.

18. (Previously Presented) The apparatus of claim 16 further comprising a valve connecting to a spent liquid line extending from the process chamber, to the liquid reservoir, and to a drain, with the valve switchable between a first position, wherein spent liquid from the process chamber is directed back to the reservoir, and a second position, wherein spent liquid from the process chamber is directed to the drain.

19 – 32. (Cancelled)

33. (New) The apparatus of claim 1 further comprising a rotor in the process chamber for holding the workpiece and rotating the workpiece at about 300 rpm or higher, to form liquid on the workpiece into a thin layer.

34. (New) The apparatus of claim 1 with the liquid outlet applying liquid onto the workpiece in a direction substantially perpendicular to a plane of the workpiece.

35. (New) Apparatus comprising:

a chamber;

a rotor in the chamber for holding and rotating a workpiece;

a liquid supply source;

a liquid outlet positioned to apply a liquid onto a workpiece in the chamber;

a liquid flow line connecting the liquid supply source to the liquid outlet;

a heater for heating the liquid;

an ozone gas generator;  
an ozone gas supply line connecting the ozone gas generator to the chamber;  
a sonic energy source associated with the liquid outlet, and positioned adjacent to the workpiece for introducing sonic energy to the workpiece, with the sonic energy conducted to the surface of the workpiece through liquid flowing out of the liquid outlet.